

What is claimed is:

1. A magnetoresistance effect film,
comprising:
a seed layer;
a first pinned magnetic layer being formed on said seed layer;
an antiferromagnetically coupling layer being formed on said first pinned magnetic layer;
a second pinned magnetic layer being formed on said antiferromagnetically coupling layer;
a nonmagnetic layer being formed on said second pinned magnetic layer;
a free magnetic layer being formed on said nonmagnetic layer; and
a protection layer being formed on said free magnetic layer,
wherein said seed layer acts as a pinning layer, which fixes magnetizing directions of said first pinned magnetic layer and said second pinned magnetic layer, and
said seed layer is made of a material which does not exchange-couple with said first pinned magnetic layer.
2. The magnetoresistance effect film according to claim 1,
wherein said seed layer is made of tantalum (Ta) or an alloy including tantalum, and
a difference between total magnetic moment of said first pinned magnetic layer and that of said second pinned magnetic layer is $0.7\text{--}1.4 \text{ T} \cdot \text{nm}$.
3. The magnetoresistance effect film according to claim 1,
wherein said seed layer is made of tantalum (Ta) or an alloy including tantalum, and
a value of a ratio “total magnetic moment of said first pinned magnetic

layer" to "that of said second pinned magnetic layer" is 1.15-1.45.

4. The magnetoresistance effect film according to claim 1,
wherein said seed layer is made of a nickel-chromium (NiCr) alloy or a
nickel-iron-chromium (NiFeCr) alloy,

concentration of nickel in the NiCr alloy or the NiFeCr alloy is 55-65
mol%, and

a difference between total magnetic moment of said first pinned
magnetic layer and that of said second pinned magnetic layer is 0.7-1.4 T · nm.

5. The magnetoresistance effect film according to claim 1,
wherein said seed layer is made of a nickel-chromium (NiCr) alloy or a
nickel-iron-chromium (NiFeCr) alloy,

concentration of nickel in the NiCr alloy or the NiFeCr alloy is 55-65
mol%, and

a value of a ratio "total magnetic moment of said first pinned magnetic
layer" to "that of said second pinned magnetic layer" is 1.15-1.45.

6. The magnetoresistance effect film according to claim 1,
wherein said seed layer has a first face and a second face,
said first pinned magnetic layer is formed on the first face of said seed
layer, and

no antiferromagnetic layer or no ferrimagnetic layer is formed on the
second face of said seed layer.

7. The magnetoresistance effect film according to claim 6,
wherein said first pinned magnetic layer is made of a cobalt-iron (CoFe)
alloy, in which concentration of cobalt is 35-71 mol%, or an alloy of
cobalt-iron-a third element, in which concentration of cobalt is 35-71 mol%,

and

the product of saturation magnetization of said pinned magnetic layer and thickness thereof is 3-7 T · nm.

8. The magnetoresistance effect film according to claim 6,
wherein said antiferromagnetically coupling layer is made of ruthenium (Ru), iridium (Ir), rhodium (Rh), chromium (Cr) or their alloy.
9. The magnetoresistance effect film according to claim 1,
wherein a coercive force of said first pinned magnetic layer is 50 Oe or more.
10. A magnetoresistance effect head,
comprising:
a lower shielding layer;
a magnetoresistance effect film being formed on said lower shielding layer; and
an upper shielding layer being formed on said magnetoresistance film,
wherein said magnetoresistance effect film includes:
a seed layer;
a first pinned magnetic layer being formed on said seed layer;
an antiferromagnetically coupling layer being formed on said first pinned magnetic layer;
a second pinned magnetic layer being formed on said antiferromagnetically coupling layer;
a nonmagnetic layer being formed on said second pinned magnetic layer;
a free magnetic layer being formed on said nonmagnetic layer;
a protection layer being formed on said free magnetic layer;

a bias layer; and

terminal layers,

said seed layer acts as a pinning layer, which fixes magnetizing directions of said first pinned magnetic layer and said second pinned magnetic layer, and

said seed layer is made of a material which does not exchange-couple with said first pinned magnetic layer.

11. A solid state memory including a magnetoresistance effect film, which comprises:

a seed layer;

a first pinned magnetic layer being formed on said seed layer;

an antiferromagnetically coupling layer being formed on said first pinned magnetic layer;

a second pinned magnetic layer being formed on said antiferromagnetically coupling layer;

a nonmagnetic layer being formed on said second pinned magnetic layer;

a free magnetic layer being formed on said nonmagnetic layer; and

a protection layer being formed on said free magnetic layer,

wherein said seed layer acts as a pinning layer, which fixes magnetizing directions of said first pinned magnetic layer and said second pinned magnetic layer, and

said seed layer is made of a material which does not exchange-couple with said first pinned magnetic layer.

12. A magnetoresistance effect film,

comprising:

a seed layer;

a first pinned magnetic layer being formed on said seed layer;

a first antiferromagnetically coupling layer being formed on said first pinned magnetic layer;

a second pinned magnetic layer being formed on said first antiferromagnetically coupling layer;

a first nonmagnetic layer being formed on said second pinned magnetic layer;

a free magnetic layer being formed on said first nonmagnetic layer;

a second nonmagnetic layer being formed on said free magnetic layer;

a third pinned magnetic layer being formed on said second nonmagnetic layer;

a second antiferromagnetically coupling layer being formed on said third pinned magnetic layer;

a fourth pinned magnetic layer being formed on said second antiferromagnetically coupling layer; and

a protection layer being formed on said fourth pinned magnetic layer,

wherein said seed layer acts as a pinning layer, which fixes magnetizing directions of said first pinned magnetic layer and said second pinned magnetic layer, and

said seed layer is made of a material which does not exchange-couple with said first pinned magnetic layer.